



DEPARTMENT OF TRANSPORTATION

[Docket No. DOT–OST–2023–0092]

Potential Research and Development Areas of Interest for the Advanced Research Projects

Agency - Infrastructure (ARPA-I); Request for Information

AGENCY: Department of Transportation (DOT)

ACTION: Notice; request for information (RFI).

SUMMARY: The Advanced Research Projects Agency - Infrastructure (ARPA-I) is a newly-designated agency within the U.S. Department of Transportation (DOT) that was authorized by Section 25012 of the Infrastructure Investment and Jobs Act of 2021 (IIJA) November 15, 2021; Pub. L. 117-58 (also known as the Bipartisan Infrastructure Law), section 25012. ARPA-I was established by Congress “to support the development of science and technology solutions that overcomes long-term challenges and advances the state of the art for United States transportation infrastructure.” ARPA-I will have a single overarching goal and focus: to fund external innovative advanced research and development (R&D) programs that develop new technologies, systems, and capabilities to improve transportation infrastructure in the United States. The purpose of this Request for Information (RFI) is to obtain input from interested parties on potential areas for future innovative advanced research and development programs to be funded and managed by ARPA-I, subject to the availability of appropriations.

DATES: Written submissions must be received within 45 days of the publication of this RFI.

ADDRESSES: Please submit any written comments to Docket Number DOT– OST–2023–0092 electronically through the Federal eRulemaking Portal at <https://www.regulations.gov>. Go to <https://www.regulations.gov> and select “Department of Transportation (DOT)” from the agency menu to

submit or view public comments. Note that, except as provided below, all submissions received, including any personal information provided, will be posted without change and will be available to the public on <https://www.regulations.gov>. You may review DOT's complete Privacy Act Statement in the Federal Register published on April 11, 2000 (65 FR 19477) or at <https://www.transportation.gov/privacy>.

FOR FURTHER INFORMATION CONTACT: For questions about this RFI, please email ARPA-I@dot.gov. You may also contact Mr. Timothy A. Klein, Director, Technology Policy and Outreach, Office of the Assistant Secretary for Research and Technology (202-366-0075) or by email at timothy.klein@dot.gov.

SUPPLEMENTARY INFORMATION: The Advanced Research Projects Agency - Infrastructure (ARPA-I) is a newly-designated agency within the U.S. Department of Transportation (DOT) that was established by Congress "to support the development of science and technology solutions that overcomes long-term challenges and advances the state of the art for United States transportation infrastructure." ARPA-I will be modeled after the Defense Advanced Research Projects Agency (DARPA) within the U.S. Department of Defense, and ARPA-E (Energy) within the U.S. Department of Energy. It will offer a once-in-a-generation opportunity to improve our nation's transportation infrastructure, both physical and digital, and will support DOT's strategic goals of Safety, Economic Strength and Global Competitiveness, Equity, Climate and Sustainability, and Transformation. ARPA-I will focus on developing and implementing technologies, rather than developing policies and processes or providing regulatory support. An ARPA-I funded technology should have a clear pathway to commercialization and widespread cross-modal deployment within 5-10 years, to have a beneficial impact on DOT's priorities. A typical ARPA-I program might run for multiple years, have a significant budget, and include multiple actively-managed R&D projects within that single program.

ARPA-I will augment and complement existing R&D activities within DOT's Office of the Assistant Secretary for Research and Technology (OST-R) and DOT's Operating Administrations, and will not supplant or duplicate those efforts. Those efforts currently include the U.S. DOT Research, Development and Technology (RD&T) Strategic Plan as well as the activities of the University Transportation Centers (UTCs). ARPA-I will fund innovative teams of researchers and developers that might include academic institutions, innovators, industry, Federally funded research and development centers (FFRDCs), infrastructure owners and operators (IOOs), and others. These teams will be funded to develop commercializable technologies that solve persistent problems in infrastructure design, development, construction, and deployment.

The aims of ARPA-I include "lowering the long-term costs of infrastructure development, including costs of planning, construction, and maintenance; reducing the lifecycle impacts of transportation infrastructure on the environment, including through the reduction of greenhouse gas emissions; contributing significantly to improving the safe, secure, and efficient movement of goods and people; promoting the resilience of infrastructure from physical and cyber threats; and ensuring that the United States is a global leader in developing and deploying advanced transportation infrastructure technologies and materials." (IIJA, 2021)

Specific Questions

Responses to this RFI are intended to inform DOT on areas of focus for future innovative R&D funding programs to be undertaken by ARPA-I.

DOT is providing the following specific questions to prompt feedback and comments. DOT encourages public comment on any of these questions, and also seeks any other information commenters believe is relevant.

DOT is requesting information from all interested entities and stakeholders, including innovators and technology developers, researchers and universities, transportation system operators, transportation-focused groups, organizations and associations, and the public.

DOT is interested in receiving succinct and relevant responses to the following six questions:

Safety:

Improving the safety of our transportation system users is of critical importance to achieving the objectives of the DOT's National Roadway Safety Strategy (NRSS) and DOT's vision of zero fatalities and serious injuries across all modes of transportation. There are many current and existing DOT safety R&D efforts that span the full spectrum from roadway and intersection design, active and passive vehicle safety systems, policy and regulatory support, human factors and human behavior research, to vulnerable road user safety improvements (such as the U.S. DOT Intersection Safety Challenge), and more. Safety spans all transportation modes and is an all-pervasive overarching goal at DOT. A number of safety research programs are currently underway at DOT, including the Federal Highway Administration (FHWA) Improving Highway Safety for All Users Program Request for Information, the National Highway Traffic Safety Administration (NHTSA) Vehicle Safety Research Program, and many others. In this current RFI, DOT is seeking information on additional, complementary, and supplemental program areas that ARPA-I can address in developing innovative new infrastructure technologies that enhance Safety across our transportation system.

Question 1: What new and emerging areas of innovation, including external early-stage research and development, should ARPA-I contemplate funding as a part of its **Safety** area of concentration, noting the agency's high-risk, high-reward focus?

Advanced Construction Materials and Methods:

The development of advanced infrastructure construction materials and methods, including for roads, highways, bridges, airports, ports, railways, and pipelines, has long been a priority for DOT. There are considerable efforts ongoing including at the Federal Aviation Administration (FAA) and FHWA in the development of low embodied carbon materials, new construction materials and new construction methods for infrastructure. For example, these might include 3D concrete printing of large structures such as bridges, culverts, and roadways, and related advanced construction methods.

Question 2: What new and emerging areas of innovation, including external early-stage research and development, should ARPA-I contemplate funding as a part of its **Advanced Construction Materials and Methods** area of concentration, noting the agency's high-risk, high-reward focus?

Digital Infrastructure:

Advances in digital infrastructure and digitalization abound. These include (but are not limited to) new technologies for mapping, sensing, connectivity and communications, networking, and computation. Transportation infrastructure is one of the largest sectors of our economy that has only begun to participate in the 'digital revolution' of information technology. The potential advantages of digitalization are pervasive, from the development of advanced centralized traffic management systems to advanced driver assistance systems (ADAS), GPS applications, machine vision and artificial intelligence. There is a considerable body of work being conducted across DOT in digital infrastructure, including at FHWA, FAA, the Intelligent Transportation System Joint Program Office (ITS JPO), and the Highly Automated Systems Safety Center of Excellence (HASS COE) within OST-R.

Question 3: What new and emerging areas of innovation, including external early-stage research and development, should ARPA-I contemplate funding as a part of its **Digital Infrastructure** area of concentration, noting the agency's high-risk, high-reward focus?

Freight and Logistics Optimization:

The seamless movement of freight across transportation modes is an essential requirement for our economic health and well-being. The COVID-19 pandemic exposed the vulnerability of our economy to disruptions in freight and logistics operations, as part of the larger breakdown in supply chains and their continuity. Increasing the resilience of freight and goods movement across our nation is essential to ensuring the uninterrupted flow of food, fuel, commodities, and consumer and industrial products from source to destination. DOT conducts research across all transportation modes in the area of freight and logistics and has recently instituted the Office of Multimodal Freight Infrastructure and Policy within the Office of the Secretary (OST), as established by the IIJA, Section 21101 (49 U.S.C. 118).

Question 4: What new and emerging areas of innovation, including external early-stage research and development, should ARPA-I contemplate funding as a part of its **Freight and Logistics Optimization** area of concentration, noting the agency's high-risk, high-reward focus?

Climate and Resilience:

Our transportation infrastructure is increasingly susceptible to damage from climate-related events, from drought to floods to sea level rise. Increasing the resilience of our infrastructure and mitigating negative effects on our transportation system across all modes is an imperative for DOT. Climate and resilience research is being conducted across all transportation modes at DOT, including in the newly reestablished DOT Climate Change Center, and includes the

reduction of greenhouse gas (GHG) emissions from transportation, the reduction of embodied carbon in infrastructure materials, and increasing physical and cyber resilience across the transportation system.

Question 5: What new and emerging areas of innovation, including external early-stage research and development, should ARPA-I contemplate funding as a part of its **Climate and Resilience** area of concentration, noting the agency's high-risk, high-reward focus?

Other Areas In Transportation Infrastructure:

DOT currently conducts a considerable amount of R&D work, both internally and externally, in many areas pertinent to transportation infrastructure.

Question 6: What other new and emerging areas of innovation associated with **transportation infrastructure**, including external early-stage research and development, should ARPA-I contemplate funding, noting the agency's high-risk, high-reward focus?

Confidential Business Information

Do not submit information disclosure of which is restricted by statute, such as trade secrets and commercial or financial information (hereinafter referred to as Confidential Business Information "CBI") to Regulations.gov. Comments submitted through Regulations.gov cannot be claimed as CBI. Comments received through the website will waive any CBI claims for the information submitted.

Issued in Washington, D.C., on June 6, 2023.

Robert C. Hampshire,

Acting Assistant Secretary for Research and Technology.

